Study of a European male champion in 10-km road races in the age group >85 years

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Abstract: An 86-year-old man became a double champion in the European championship for road running in 2009. He won the 10-km road run with a time of 58:01 minutes, setting a new European record for men aged 85 and older. Two days later, he became a European champion in the same age group for the half-marathon, with a time of 2:17 hours. He started his running career at the age of 64 years and has trained for about an hour three times a week every year since. During these 22 years, he has performed several road runs each year, ranging from 2.5 to 10 km, and also completed a number of half-marathons. Although his running speeds had progressively slowed since the age of 64, there was an increased rate of decline at the age of 82. This man's outstanding performance should encourage other master runners to continue running and competing past the age of 85.

Study of a European male champion in 10-km road races in the age group >85 years

Beat Knechtle, MD, Götz Kohler, PhD, and Thomas Rosemann, MD, PhD

An 86-year-old man became a double champion in the European championship for road running in 2009. He won the 10-km road run with a time of 58:01 minutes, setting a new European record for men aged 85 and older. Two days later, he became a European champion in the same age group for the half-marathon, with a time of 2:17 hours. He started his running career at the age of 64 years and has trained for about an hour three times a week every year since. During these 22 years, he has performed several road runs each year, ranging from 2.5 to 10 km, and also completed a number of half-marathons. Although his running speeds had progressively slowed since the age of 64, there was an increased rate of decline at the age of 82. This man's outstanding performance should encourage other master runners to continue running and competing past the age of 85.

On 29 May 2009, our 86-year-old runner won the 10-km road run at the European Championship in Aarhus, Denmark, in 58:01 minutes and set a new European record in the group of men aged 85 and older. Two days later, he won the half-marathon with a time of 2:17 hours. He became a double European champion in his age group but unfortunately missed a second European record by 17 minutes.

Our runner started with regular running training after his retirement at the age of 64. Throughout these 22 years he completed, without a break, three running units of about an hour per unit each week. His average running speed was 7 to 8 min/km, depending upon the course, while running three different routes. He performed both an interval training and a hill run once a month. The runs on Monday and Wednesday were rather low intensity; the run on Friday was rather high intensity. Every year he completed several road runs of 2.5 to 10 km. As shown in the *Figure,* his running speed from age 64 to 86 progressively decreased, with a drop in the curve at age 82 to 83.

Two months before achieving his title as European champion, he became Swiss champion in a 10-km track, with a time of 57:06 minutes. One month before the European championship, we performed a maximal oxygen consumption test (VO_2 max) on a cycle ergometer, since we had no treadmill available. In a stepwise protocol, he achieved 153 watts with a maximum heart rate of 127 beats per minute and a VO_2 max of 36 mL/kg/min. The VO_2 max value would have been higher in a treadmill test due to the specificity of training. On the same occasion, we determined percentage of body fat and skeletal muscle mass using an anthropometric method, based on the formulas of Ball et al (1) and Lee et al (2). Our athlete, with 1.74 m body height, 73 kg body mass, and a body mass index of 24.2 kg/m^2, had a skeletal muscle mass of 29.9 kg and a body fat percentage of 18.4%, equal to a fat mass of 12.9 kg.

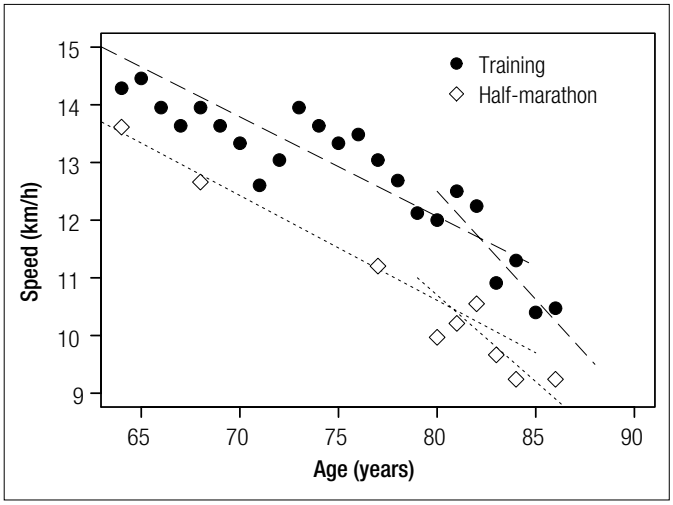

Figure. Speed in training runs (10-km road runs) and race runs (half marathons) across age.

DISCUSSION

The performance of this 86-year-old runner is impressive. Although he showed an increased rate of decline in performance at the age of 82 as well as the ongoing overall decline in performance, he was still able to compete at an international championship level and to become a double European champion.

In a longitudinal study over 22 years performed by Trappe et al (3), the aerobic capacity of highly trained middle-aged

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men declined approximately 5% to 7% per decade, equal to an average decrease of 0.6% per year. Our runner performed his first half-marathon at the age of 64 within 1:33 hours. In 2009 he was 44 minutes slower (–47%) and his running speed over 10 km decreased from 14.3 km/h at the age of 64 to 10.0 km/h at the age of 86 (–35%). Expressed as a percentage, race time increased by 2.1% per year (21% per decade) and running speed over 10 km decreased by 1.6% (16% per decade). These disparate findings might be explained by the fact that we investigated our runner between the ages of 64 and 86, while Trappe et al (3) investigated their runners between the ages of 46 and 68 years.

Also, other studies investigated endurance athletes of <80 years. In men aged 20 to 75 years, VO_2 max was maintained in endurance-trained men until the age of 50 years. The accelerated decline in VO_2 max after the age of 50 years was related to a decline in training volume and was associated with an increase in 10-km running times (4). The longitudinal decline in VO_2 max in older male endurance athletes is highly dependent upon the continued magnitude of training stimulus (5). Our athlete, however, maintained training volume during his career, but speed in both the 10-km (training) and half-marathon races declined over time.

Performance decreased in a curvilinear fashion in our runner, with a significant drop at the age of 82. In senior athletes, the decline between 50 and 75 years is about 3.4% per year and dramatically increases after the age of 75 years (6). When older athletes of 70 years were considered over a 20-year period, physiological capacity became reduced by 15% to 34% per decade, depending upon the fitness level (7). These results are in line with the decrease found in our athlete. Injuries of the lower limbs or problems with the musculoskeletal system might also be an explanation. However, our athlete suffered no orthopaedic problems of the lower limbs at or after the age of 82 years.

In conclusion, an elderly runner with continuous running training during the age of 64 to 86 years is still able, at the age of 86, to finish and win a 10-km road run and a half-marathon and to become a double European champion. A weekly training volume of 3 hours seems to be sufficient. We assume that our runner missed the second European record for a half-marathon because he focused more on 10-km road running than on half-marathons during his 22 years of training.

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